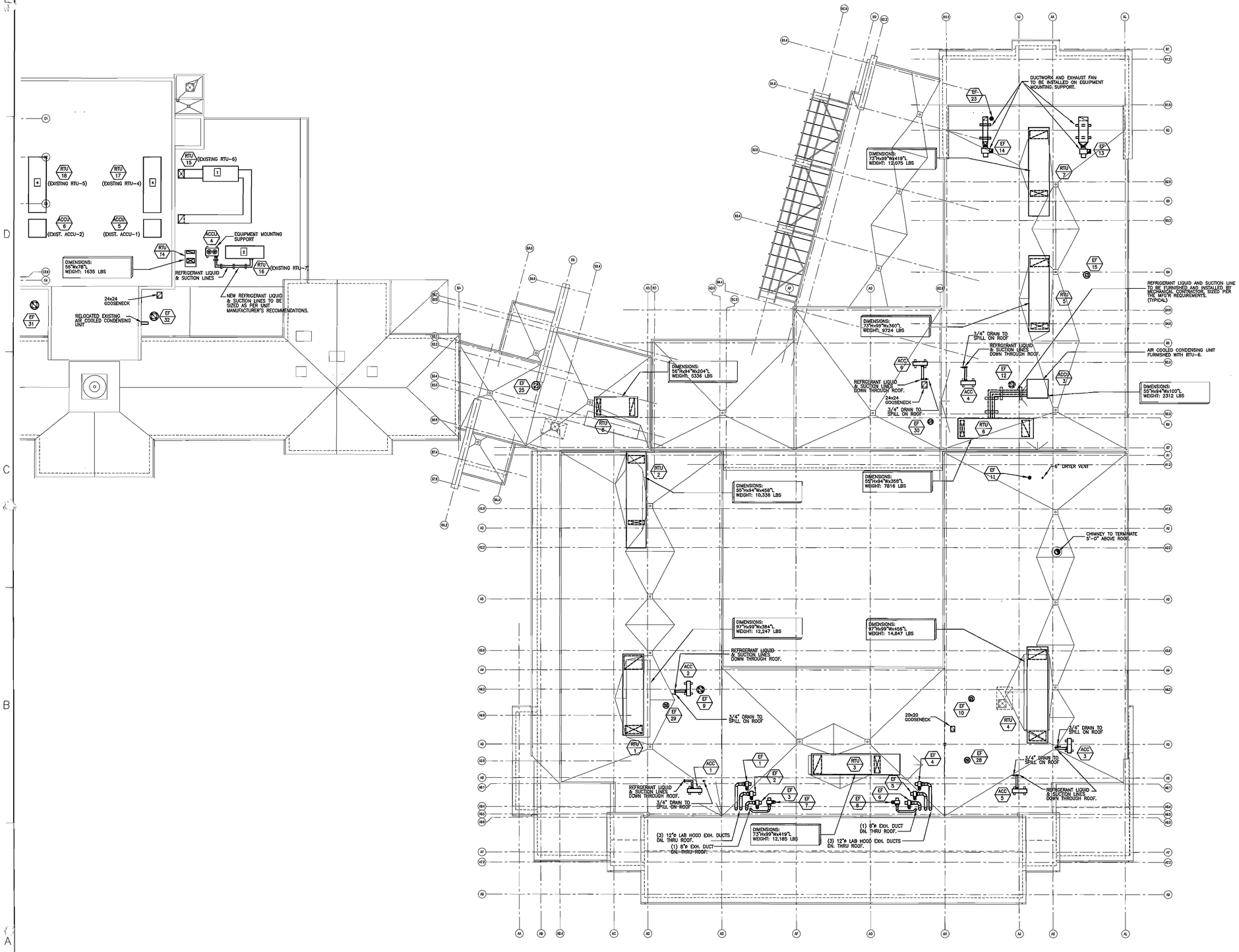




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# NEEDHAM HIGH SCHOOL - RENOVATION & ADDITION

## Needham, Massachusetts

GRIFFITH & VARY, INC.
Consulting Engineers
12 Kendrick Road
Wareham, MA 02571
508-295-0050 (T)
508-295-0003 (F)

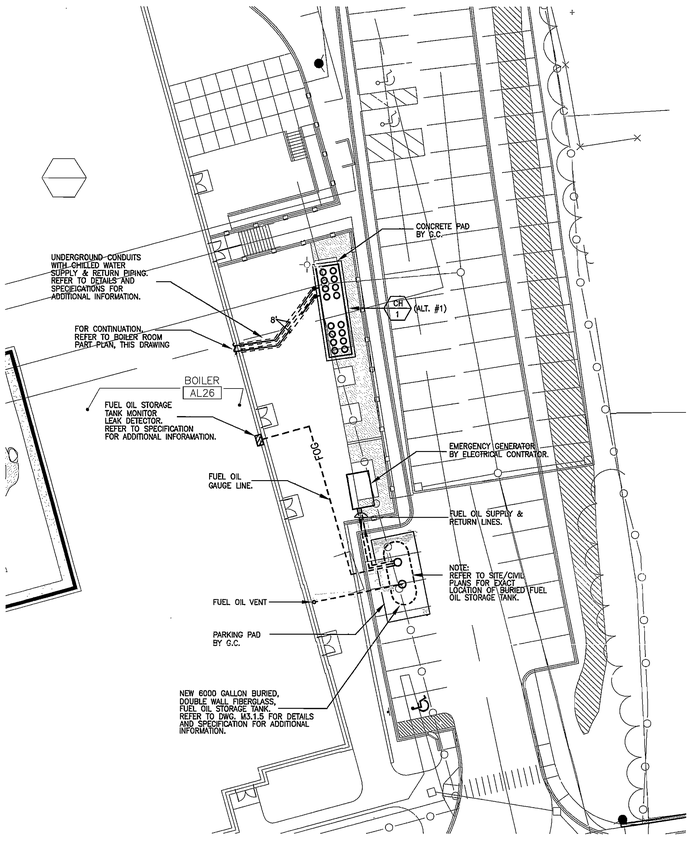
KEYPLAN

KEY PLAN

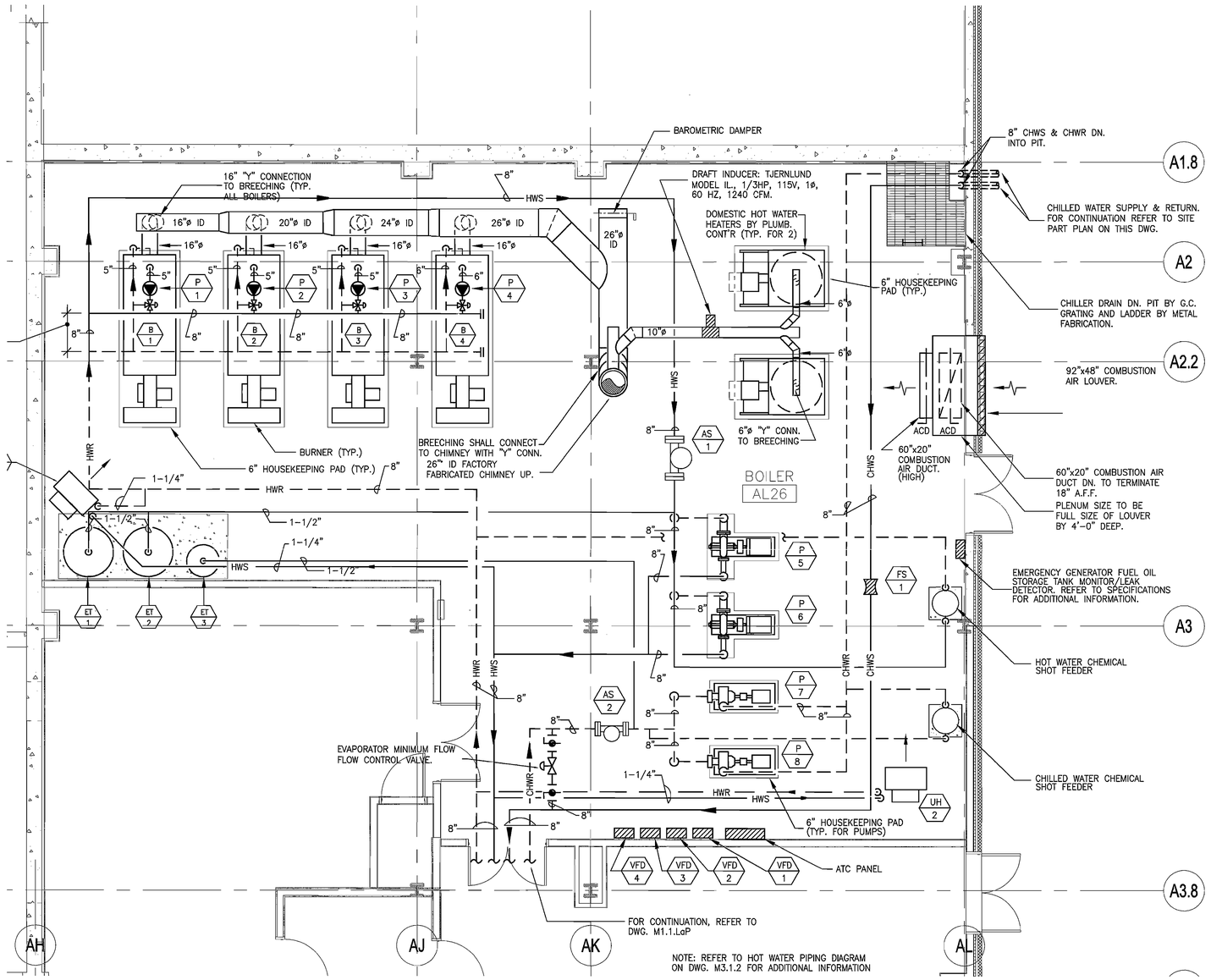
# ROOF PLAN AREA "A" & "B" MECHANICAL

Scale: 1/8"=1'-0"
Job No.: 03006.00
Drawn By: JLG
Date: Oct. 8, 2004

M1.1.4




SITE PART PLAN
SCALE: 1" = 20'-0"




BOILER ROOM PART PLAN
SCALE: 1/4" = 1'-0"



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**-**
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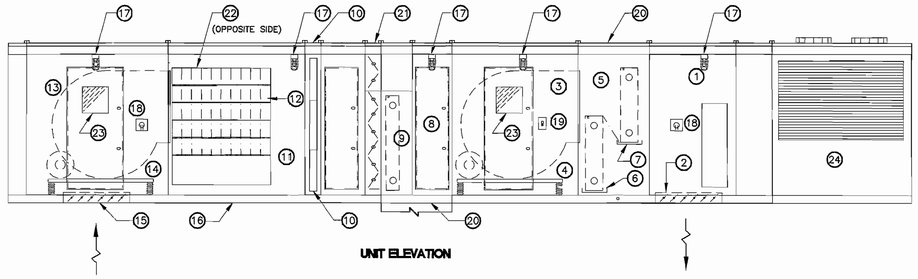
KEYPLAN

KEY PLAN

**MECHANICAL DETAILS & PART PLANS**

Scale: **AS NOTED**
Job No.: 03006.00
Drawn By: **JLG**
Date: Oct. 8, 2004

**M3.1.6**




UNIT ELEVATION

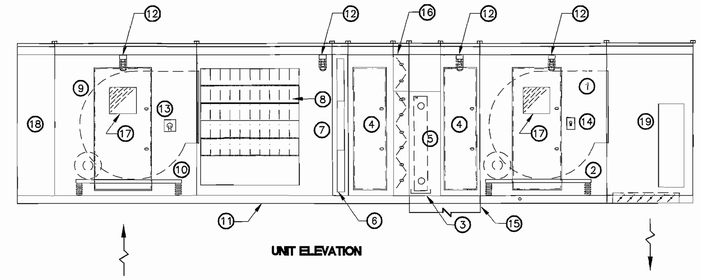
NOTE: REFER TO SPECIFICATION FOR ADDITIONAL INFORMATION

1. DISCHARGE PLENUM SECTION. DOUBLE CONSTRUCTION WITH 20 GAUGE PERFORATED GALVANIZED STEEL LINER.
2. SUPPLY SMOKE DAMPER FURNISHED & INSTALLED BY UNIT MANUFACTURER. SIZE TO MATCH UNIT SUPPLY AIR OPENING. SMOKE DAMPER REQUIRED ON RTU-1,4,5, & 9.
3. SUPPLY FAN SECTION. DOUBLE WIDTH, DOUBLE INLET, AIRFOIL FAN. FAN SHALL BE FURNISHED WITH FAN INLET AIR FLOW STATION
4. STRUCTURAL STEEL FAN ISOLATION BASE. FAN SHALL BE ISOLATED FROM OUTER CASING WITH FACTORY INSTALLED 2" DEFLECTION SPRING VIBRATION/SEISMIC ISOLATORS.
5. CHILLED WATER COOLING COIL SECTION. (TYP. FOR RTU-1,4,5,8&12) DX COOLING COIL SECTION (TYP. FOR RTU-2,3,6,7,&9)
6. STAINLESS STEEL COOLING COIL DRAIN PAN.
7. STAINLESS STEEL COOLING COIL INTERMEDIATE DRAIN PAN.
8. ACCESS SECTION.
9. HOT WATER PREHEAT COIL SECTION.
10. 30% EFFICIENCY PRE-FILTERS.
11. EXHAUST/MIXING BOX SECTION.
12. EXHAUST AIR OUTLET. FRESH AIR INTAKE ON OPPOSITE SIDE OF UNIT.
13. RETURN FAN SECTION. REFER TO SCHEDULE FOR FAN TYPE. RETURN FAN SECTION SHALL BE DOUBLE WALL CONSTRUCTION WITH 20 GAUGE PERFORATED GALVANIZED STEEL LINER. FAN SHALL BE FURNISHED WITH FAN INLET AIR FLOW STATION.
14. STRUCTURAL STEEL FAN ISOLATION BASE. FAN SHALL BE ISOLATED FROM OUTER CASING WITH FACTORY INSTALLED 2" DEFLECTION SPRING VIBRATION/SEISMIC ISOLATORS.
15. RETURN SMOKE DAMPER FURNISHED & INSTALLED BY UNIT MANUFACTURER. SIZE TO MATCH UNIT RETURN AIR OPENING. SMOKE DAMPER REQUIRED ON RTU-1,4,5, & 9.
16. UNIT BASE RAIL.
17. MARINE LIGHT.
18. WEATHER PROOF DUPLEX OUTLET.
19. WEATHER PROOF LIGHT SWITCH. ONE SWITCH SHALL CONTROL ALL INTERIOR LIGHTS.
20. PIPE VESTIBULE. PIPE VESTIBULE SHALL EXTEND DOWN TO ROOF CURB. PIPE VESTIBULE SHALL ENCLOSE HOT WATER SUPPLY & RETURN PIPING FOR PREHEAT COIL AS WELL AS CHILLED WATER SUPPLY & RETURN PIPING. PIPE VESTIBULE TO BE PROVIDED WITH DOUBLE WALL, INSULATED AND GASKETED DOORS SUITABLE FOR PRACTICAL ACCESS TO VALVES AND PIPING.
21. INTERNAL FACE & BYPASS DAMPERS.(EXCLUDING RTU-8)
22. FRESH AIR INTAKE WITH RAIN HOOD. FRESH AIR INTAKE SHALL BE FURNISHED WITH MINIMUM OUTSIDE AIR DAMPER WITH INTEGRAL AIR FLOW STATION (RUSKIN AMS-60 OR APPROVED EQUAL) DAMPER SHALL BE SIZED FOR AN AIR VELOCITY OF 1000 FPM.
23. VIEW PORT
24. INTEGRAL AIR COOLED CONDENSING UNIT (RTU-2,3,7,&9). RTU-6 SHALL BE FURNISHED WITH SEPARATE AIR COOLED CONDENSING UNIT.

NOTE: RTU-1,3,4,5,7,&9 SHALL HAVE VARIABLE FREQUENCY DRIVES FACTORY MOUNTED AND WIRED INSIDE SUPPLY FAN SECTION. RTU-2&6 SHALL HAVE VARIABLE FREQUENCY DRIVES FACTORY MOUNTED AND WIRED INSIDE ACCESS SECTION. RTU-12 SHALL HAVE VARIABLE FREQUENCY DRIVES FACTORY MOUNTED AND WIRED INSIDE CONTROL ENCLOSURE.

## ROOFTOP UNIT DETAIL (TYPICAL FOR RTU-1 THRU 9 & 12)

NO SCALE



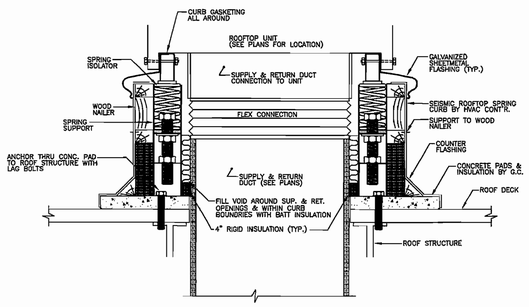
UNIT ELEVATION

NOTE: REFER TO SPECIFICATION FOR ADDITIONAL INFORMATION

1. SUPPLY FAN SECTION. DOUBLE WIDTH, DOUBLE INLET, AIRFOIL FAN.
2. STRUCTURAL STEEL FAN ISOLATION BASE. FAN SHALL BE ISOLATED FROM OUTER CASING WITH FACTORY INSTALLED 2" DEFLECTION SPRING VIBRATION/SEISMIC ISOLATORS.
3. STAINLESS STEEL COIL DRAIN PAN.
4. ACCESS SECTION.
5. HOT WATER PREHEAT COIL SECTION.
6. 30% EFFICIENCY PRE-FILTERS.
7. EXHAUST/MIXING BOX SECTION.
8. EXHAUST AIR OUTLET. FRESH AIR INTAKE ON OPPOSITE SIDE OF UNIT.
9. RETURN FAN SECTION. DOUBLE WIDTH, DOUBLE INLET, AIRFOIL FAN. RETURN FAN SECTION SHALL BE DOUBLE WALL CONSTRUCTION WITH 20 GAUGE PERFORATED GALVANIZED STEEL LINER. (EXCLUDING RTU-10 & 13)
10. STRUCTURAL STEEL FAN ISOLATION BASE. FAN SHALL BE ISOLATED FROM OUTER CASING WITH FACTORY INSTALLED 2" DEFLECTION SPRING VIBRATION/SEISMIC ISOLATORS.
11. UNIT BASE RAIL.
12. MARINE LIGHT.
13. WEATHER PROOF DUPLEX OUTLET.
14. WEATHER PROOF LIGHT SWITCH. ONE SWITCH SHALL CONTROL ALL INTERIOR LIGHTS.
15. PIPE VESTIBULE. PIPE VESTIBULE SHALL EXTEND DOWN TO ROOF CURB. PIPE VESTIBULE SHALL ENCLOSE HOT WATER SUPPLY & RETURN PIPING FOR PREHEAT COIL. PIPE VESTIBULE TO BE PROVIDED WITH DOUBLE WALL, INSULATED AND GASKETED DOORS SUITABLE FOR PRACTICAL ACCESS TO VALVES AND PIPING.
16. INTERNAL FACE & BYPASS DAMPERS
17. VIEW PORT
18. CONTROL ENCLOSURE
19. DISCHARGE PLENUM SECTION. DOUBLE CONSTRUCTION WITH 20 GAUGE PERFORATED GALVANIZED STEEL LINER.

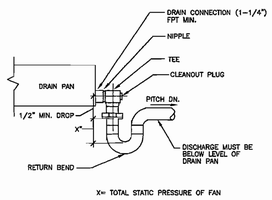
## ROOFTOP UNIT DETAIL (TYPICAL FOR RTU-10, 11 & 13)

NO SCALE




## ROOFTOP UNIT CURB DETAIL

NO SCALE




X= TOTAL STATIC PRESSURE OF FAN

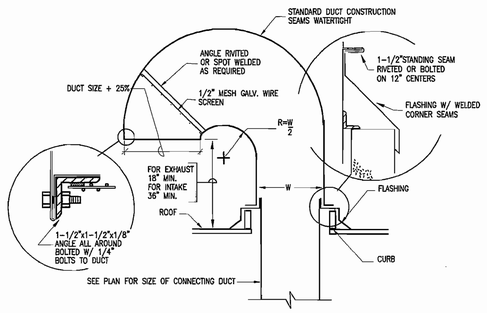
NOTES:

1. ALLOW SUFFICENT SPACE BELOW DRAIN PAN FOR TRAP.
2. PITCH DRAIN FOR PROPER RUNOFF.
3. MANUALLY PRIME FILL TRAP BEFORE STARTUP TO FORM INITIAL DRAIN SEAL.

SUPPORT LENGTHY DRAINS LINES TO PREVENT SAG AND CONDENSATE OVERFLOW.

## DRAIN PAN WATER SEAL PIPING DETAIL

NO SCALE

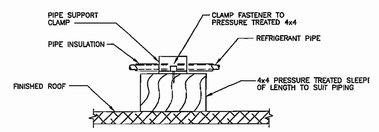



NOTES:

1. SEE ARCHITECTURAL DRAWINGS &/OR SPECIFACATIONS FOR CURB, FLASHING & ROOFING
2. WHEN WOOD PLATE IS PROVIDED AROUND TOP OF CURB, SECURE FLASHING & GOOSENECK TO WOOD PLATE WITH 3/8" CADMIUM PLATED LAG BOLTS NOT OVER 12" ON CENTERS
3. WHEN PREFAB. METAL CURB IS USED, SECURE FLASHING & GOOSENECK WITH SHEET METAL SCREWS AS REQUIRED FOR TIGHT JOINTS & RIGID INSULATION

## RECTANGULAR GOOSENECK DETAIL

NO SCALE




## REFRIGERANT PIPING SUPPORT DETAIL

NO SCALE



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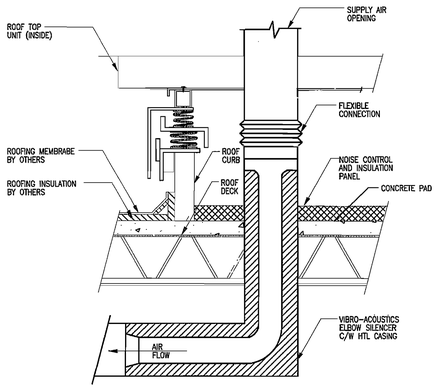
## MECHANICAL DETAILS

Scale: AS NOTED
Job No.: 03006.00
Drawn By: KN
Date: Oct. 8, 2004

M3.1.4




ELBOW SILENCER DETAIL
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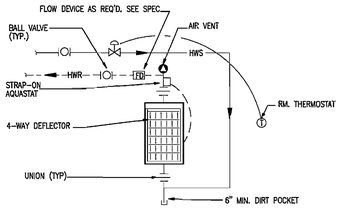
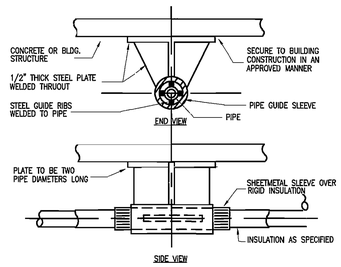
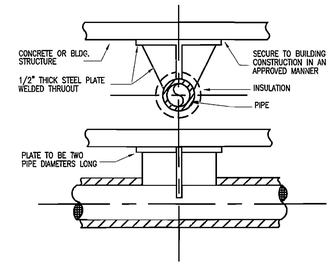



HORIZONTAL UNIT HEATER PIPING DETAIL
NO SCALE



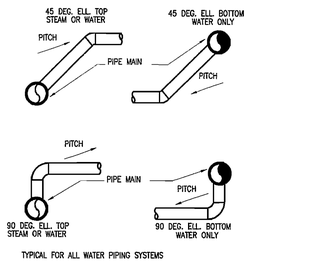

NOTES:
1. CONCRETE ATTACHMENTS SHALL BE HILTI OR APPROVED EQUAL
2. STEEL ATTACHMENTS SHALL BE WELDED OR BOLTED
3. FOR PIPES W/ CENTERLINE LESS THAN 18" BELOW SLAB OR BEAM

PIPE GUIDE DETAIL
NO SCALE



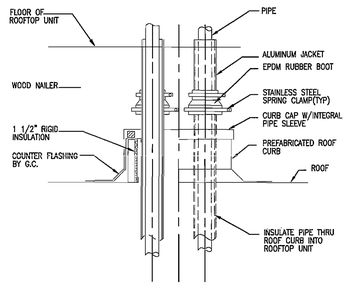

NOTES:
1. CONCRETE ATTACHMENTS SHALL BE HILTI OR APPROVED EQUAL
2. STEEL ATTACHMENTS SHALL BE WELDED OR BOLTED
3. FOR PIPES W/ CENTERLINE LESS THAN 18" BELOW SLAB OR BEAM

PIPE ANCHOR DETAIL
NO SCALE

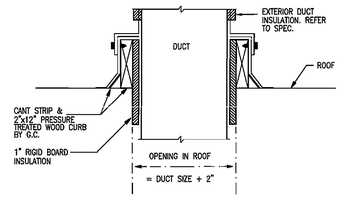



TYPICAL FOR ALL WATER PIPING SYSTEMS

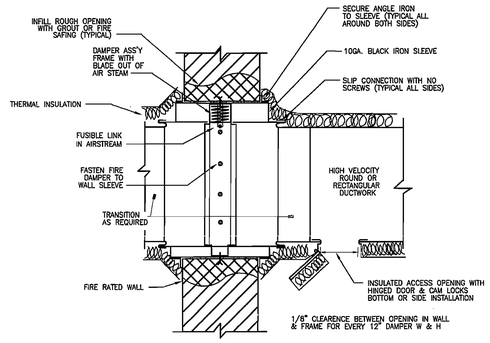
TYPICAL BRANCH PIPE TAKE-OFF DETAIL
NO SCALE




PIPING ROOF PENETRATION
NO SCALE

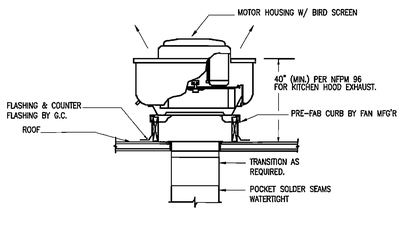



DUCTWORK ROOF PENETRATION DETAIL
NO SCALE

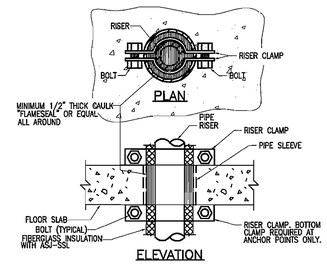



1. FIRE DAMPER FOR FLOOR PENERTRATIONS TO BE SPRING LOADED

FIRE DAMPER DETAIL
NO SCALE

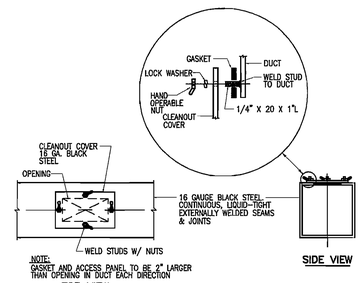



TOP DISCHARGE CENTRIFUGAL ROOF EXHAUSTER DETAIL
NO SCALE




ELEVATION

SUPPORT/ANCHOR FOR PIPE RISERS
NO SCALE

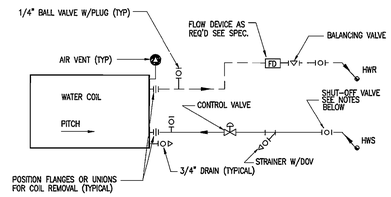



NOTE: GASKET AND ACCESS PANEL TO BE 2" LARGER THAN OPENING IN DUCT EACH DIRECTION

TOP VIEW

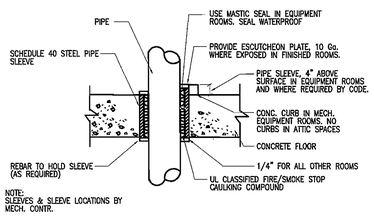
EXHAUST DUCT ACCESS PANEL DETAIL
NO SCALE

NOTE: FOR KITCHEN EXHAUST DUCTWORK SYSTEM



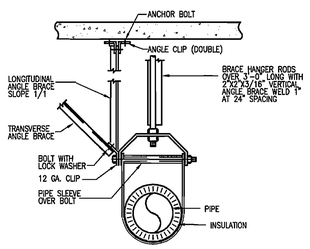

NOTES:
1. COIL TO BE PIPED COUNTER FLOW TO AIR FLOW
2. VALVES UP TO 2" SHALL BE BALL VALVES
3. VALVES 2 1/2" & LARGER SHALL BE GATE VALVES

TYPICAL ONE SECTION HIGH WATER HEATING OR REHEAT COIL PIPING DETAIL W/ TWO - WAY VALVE
NO SCALE




NOTE:
SLEEVES & SLEEVE LOCATIONS BY MECH. CONTR.

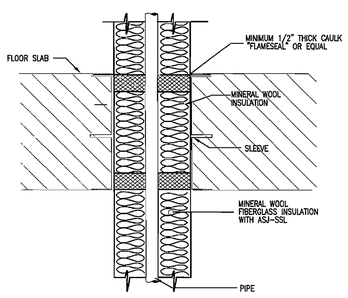
TYPICAL FLOOR PIPING SLEEVE DETAIL
NO SCALE



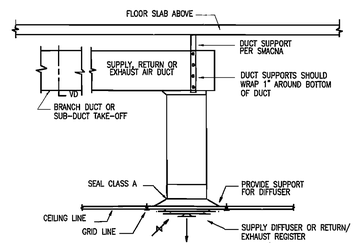

| PIPE SIZE | * ANGLE BRACE | BOLT TO ANGLE | ANGLE CLIP | ANCHOR BOLT OR INSERT |
|---|---|---|---|---|
| 2 1/2" | 2"X2" 16 GA. | 3/8" | 3"X3"X1/4 | 3/8 |
| 3", 4" | 2 1/2"X2 1/2" 16 GA. | 3/8" | 3"X3"X1/4 | 1/2 |
| 5", 6" | 2 1/2"X2 1/2" 16 GA. | 1/2" | 5"X3"X1/2 | 3/4 |
| 8" | 3"X3" 12 GA. | 5/8" | 2-5"X3"X1/2 | 2-5/8 |
| 10" | 3"X3" 12 GA. | 3/4" | 2-5"X3"X1/2 | 2-3/4 |

* 1 5/8 X 1 5/8 X 12 GAGE CHANNEL MAY BE USED.

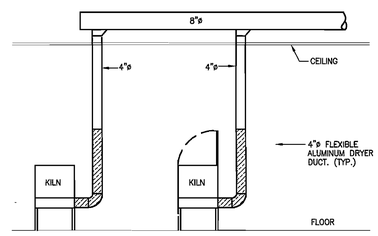
TYPICAL SEISMIC BRACING FOR PIPE DETAIL
NO SCALE




FIRESTOPPING DETAIL-PIPING
NO SCALE




TYPICAL SUPPLY DIFFUSER OR RETURN / EXHAUST REGISTER DETAIL
NO SCALE




KILN EXHAUST
NO SCALE



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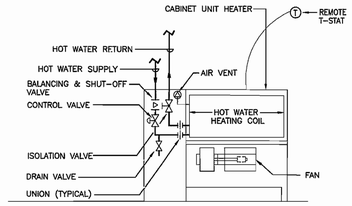
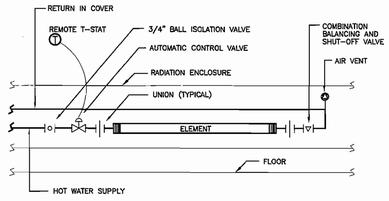
M3.1.3



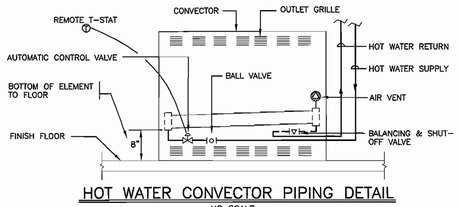

PIPING TO CABINET UNIT HEATER DETAIL

NO SCALE



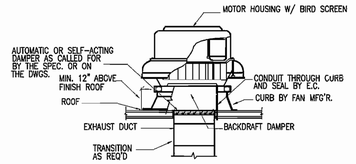

RETURN IN COVER RADIATION PIPING DETAIL

NO SCALE



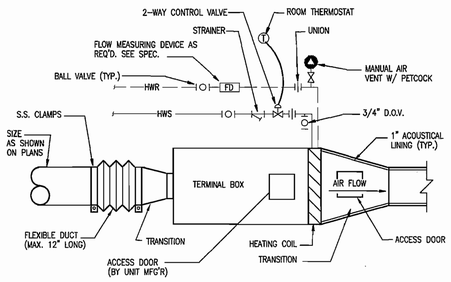

HOT WATER CONVECTOR PIPING DETAIL

NO SCALE



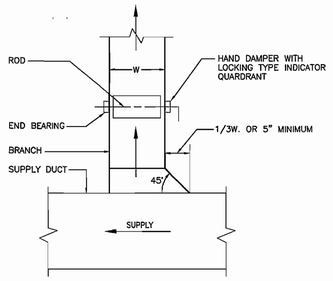

CENTRIFUGAL ROOF EXHAUSTER DETAIL WITH PREFABRICATED CURB

NO SCALE



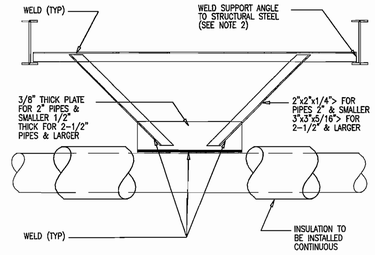

VARIABLE AIR VOLUME OR CONSTANT VOLUME TERMINAL BOX WITH HEATING COIL DETAIL

NO SCALE




BRANCH TAKE-OFF W/VOLUME DAMPER DETAIL

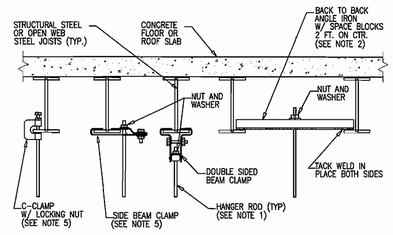
NO SCALE




NOTE:
1. CONTRACTOR TO SUBMIT SKETCH OF PROPOSED INSTALLATION INCLUDING SIZES OF MEMBERS, WELDS & BOLTS TO STRUCTURAL ENGINEER FOR APPROVAL
2. WELD ENTIRE LENGTH OF SUPPORT ANGLE WHERE SUPPORT ANGLE IS RUN PARALLEL TO STRUCTURAL STEEL

PIPE HANGER DETAIL STRUCTURAL STEEL

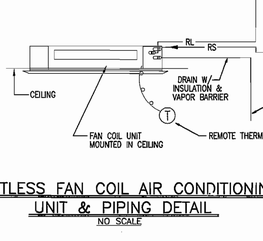
NO SCALE




1. REFER TO PIPE HANGER DETAIL FOR HANGER ROD SIZE. FOR CEILING SUSPENDED EQUIPMENT PROVIDE MIN. 3/8" DIA. HANGER ROD (REFER TO MANUFACTURERS INSTALLATION INSTRUCTIONS).
2. FOR PIPES UNDER 2" USE A SINGLE 1-1/2"x1-1/2"x1/4" ANGLE IRON WITH C-CLAMP. FOR PIPES 2-1/2" AND LARGER USE 3"x3"x1/4" ANGLE IRON BACK TO BACK AS SHOWN.
3. REFER TO "TYPICAL METHOD OF SECURING HANGER RODS TO CONCRETE DECK DETAIL" FOR ATTACHING HANGER RODS TO CONCRETE DECK.
4. REPAIR OF FIREPROOFING IN ORDER TO FACILITATE THE INSTALLATION OF HANGER RODS IN EXISTING CONSTRUCTION SHALL BE BY THE G.C.
5. USE OF C-CLAMPS AND SIDE BEAM CLAMPS IS LIMITED TO PIPING 2-1/2" AND UNDER.

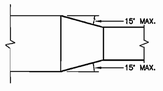
TYPICAL METHODS OF SECURING HANGER RODS TO STRUCTURL STEEL DETAIL

NO SCALE



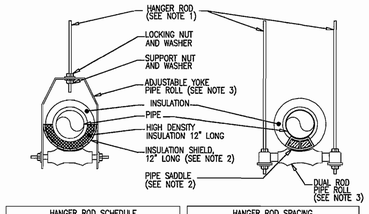

SQUARE ELBOW DETAIL

NO SCALE




DUCT TRANSITION DETAIL

NO SCALE



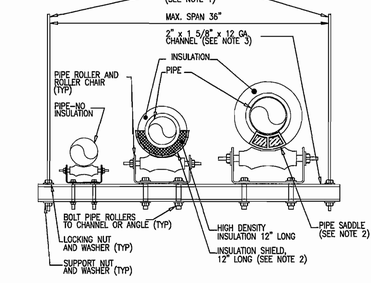

| HANGER ROD SCHEDULE | |
|---|---|
| PIPE SIZE | ROD SIZE |
| 4" | 5/8" DIA. |
| 5" | 5/8" DIA. |
| 6" | 3/4" DIA. |
| 8" | 7/8" DIA. |
| 10" | 7/8" DIA. |
| 12" | 7/8" DIA. |

| HANGER ROD SPACING | |
|---|---|
| PIPE SIZE | MAX. ALLOWABLE SPACING |
| 4" | 10' |
| 5" | 10' |
| 6" | 10' |
| 8" | 10' |
| 10" | 10' |
| 12" | 10' |

NOTE:
1. REFER TO "TYPICAL METHOD OF SECURING HANGER RODS DETAIL" FOR ATTACHING HANGERS TO THE STRUCTURE.
2. PROVIDE INSULATION SHIELD OR PIPE SADDLE BASED ON THE PIPING SYSTEM AND PIPE SIZE AS INDICATED IN THE SPECIFICATIONS.
3. ADJUSTABLE YOKE PIPE ROLL SHALL BE USED ON 4" AND 5" PIPING. ON ALL PIPING 6" AND LARGER USE DUAL ROD PIPE ROLL.

PIPE ROLL TYPE PIPE HANGER INSTALLATION DETAIL

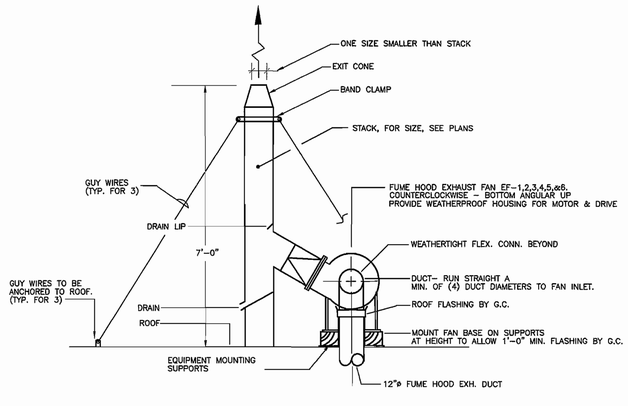
NO SCALE




NOTE:
1. REFER TO "TYPICAL METHOD OF SECURING HANGER RODS DETAIL" FOR ATTACHING HANGERS TO THE STRUCTURE.
2. PROVIDE INSULATION SHIELD OR PIPE SADDLE BASED ON THE PIPING SYSTEM AND PIPE SIZE AS INDICATED IN THE SPECIFICATIONS.
3. TRAPEZE TYPE HANGER SHALL BE USED FOR A MAXIMUM 1000 LB. UNIFORM LOAD.

TRAPEZE TYPE PIPE HANGER INSTALLATION DETAIL

NO SCALE



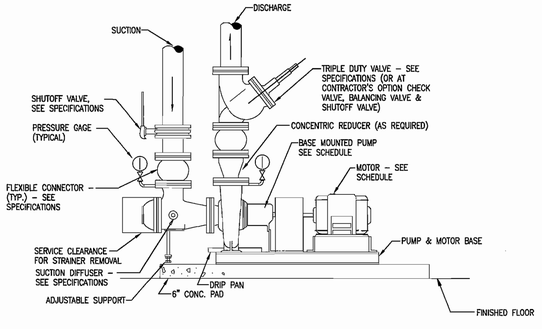

OFFSET STACK DETAIL - FUME HOOD EXHAUST SYSTEM

NO SCALE



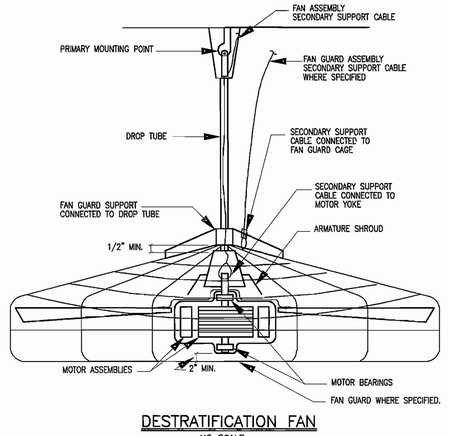

DUCTLESS FAN COIL AIR CONDITIONING UNIT & PIPING DETAIL

NO SCALE




END SUCTION PUMP DETAIL

NO SCALE




DESTRATIFICATION FAN

NO SCALE



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# NEEDHAM HIGH SCHOOL - RENOVATION & ADDITION

## Needham, Massachusetts

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## MECHANICAL DETAILS

Scale: AS NOTED
Job No.: 03006.00
Drawn By: KN
Date: Oct. 8, 2004

M3.1.1